

Applicants : Brent J. Bos, Kenneth Schofield, Mark L. Larson and Niall R. Lynam
Serial No. : 10/823,323
Page : 3

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the present application:

1-102 (canceled).

103 (currently amended): An interior rearview mirror system suitable for use in a vehicle, said interior rearview mirror system comprising:

an interior rearview mirror assembly adapted for attachment to an interior portion of the vehicle, said interior rearview mirror assembly comprising an electrochromic reflective element;

electronic circuitry operable to control said electrochromic reflective element;

an imaging sensor positioned in the interior of the vehicle and with a field of view through a window of the vehicle to the exterior of the vehicle, said imaging sensor generating outputs indicative of sensed images;

~~a rain-sensor control responsive to an output signal~~ said outputs of said imaging sensor, said ~~rain-sensor control~~ being operable to control at least one of (a) a windshield wiper of the vehicle and (b) a defogging system of the vehicle ~~in response responsive to said output signal outputs;~~

~~a headlamp control responsive to an output signal of said imaging sensor, said headlamp control further~~ being operable to control a headlamp of the vehicle ~~in response responsive to said output signal outputs;~~ and

wherein said ~~rain-sensor control and said headlamp control~~ at least one of (a) ~~access~~ accesses a common component of said electronic circuitry operable to control said electrochromic reflective element, and (b) ~~share shares~~ a common component of said electronic circuitry operable to control said electrochromic reflective element.

Applicants : Brent J. Bos, Kenneth Schofield, Mark L. Larson and Niall R. Lynam
Serial No. : 10/823,323
Page : 4

104 (currently amended): The interior rearview mirror system of claim 103, wherein said imaging sensor is positioned in the interior of the vehicle at or near said interior rearview mirror assembly and has a field of view forward and through a windshield of the vehicle.

105 (currently amended): The interior rearview mirror system of claim 103, wherein said imaging sensor comprises first and second imaging ~~sensors~~ arrays, said ~~rain sensor~~ control being operable to control at least one of a windshield wiper of the vehicle and a defogging system of the vehicle in response to an output ~~signal~~ from said first imaging ~~sensor~~ array and said ~~headlamp~~ control being operable to control a headlamp of the vehicle in response to an output signal from said second imaging ~~sensor~~ array.

106 (currently amended): The interior rearview mirror system of claim 105, wherein said first imaging ~~sensor array~~ is positioned at a housing for a center high mounted stop lamp of the vehicle, said first imaging ~~sensor array~~ having a field of view through a rear window of the vehicle to the exterior of the vehicle.

107 (currently amended): The interior rearview mirror system of claim 105, wherein said second imaging ~~sensor array~~ is positioned in the interior of the vehicle at or near said interior rearview mirror assembly, said second imaging ~~sensor array~~ having a field of view forward and through a windshield of the vehicle.

108 (previously presented): The interior rearview mirror system of claim 103, wherein at least a portion of said electronic circuitry is included on a printed circuit board.

109 (previously presented): The interior rearview mirror system of claim 103, wherein said electronic circuitry includes at least one of a remote keyless entry receiver, a microphone, a digital voice recorder, a vehicle status indicator and a display element.

Applicants : Brent J. Bos, Kenneth Schofield, Mark L. Larson and Niall R. Lynam
Serial No. : 10/823,323
Page : 5

110 (previously presented): The interior rearview mirror system of claim 103, wherein said electronic circuitry is associated with a display element.

111 (previously presented): The interior rearview mirror system of claim 110, wherein said display element comprises at least one of a vehicle status display, a blind spot indicator display, a compass display, a temperature display, a tire inflation status display, a passenger side inflatable restraint status display, an automatic rain sensor display, a telephone dial information display, and a highway status information display.

112 (previously presented): The interior rearview mirror system of claim 110, wherein said display element provides at least two display functions.

113 (previously presented): The interior rearview mirror system of claim 112, wherein said display element may be selectively operable to provide one of said at least two display functions.

114 (previously presented): The interior rearview mirror system of claim 113, wherein said display element may be selectively switched between said at least two display functions in response to at least one of a voice command, a user input, a timing device and a vehicle status change.

115 (currently amended): The interior rearview mirror system of claim 103, wherein the window comprises a windshield of the vehicle, said ~~headlamp~~ control being operable to control a headlamp of the vehicle in response to a level of light present at the windshield.

116 (currently amended): The interior rearview mirror system of claim 103, wherein said ~~rain sensor~~ control is operable to process said ~~output signal~~ outputs to detect water droplets at the exterior surface of the window and fog particles at the interior surface of the window.

Applicants : Brent J. Bos, Kenneth Schofield, Mark L. Larson and Niall R. Lynam
Serial No. : 10/823,323
Page : 6

117 (currently amended): The interior rearview mirror system of claim 116, wherein said ~~rain sensor~~-control is operable to control a window wiper of the vehicle in response to a detection of the presence of water droplets at the exterior surface of the window and to control a defogging system of the vehicle in response to a detection of the presence of fog particles at the interior surface of the window.

118 (currently amended): The interior rearview mirror system of claim 103, wherein said ~~rain sensor~~-control is operable to detect water droplets at an exterior surface of the window, said ~~rain sensor~~-control being operable to control a window wiper of the vehicle in response to said detection of water droplets at the exterior surface of the window.

119 (currently amended): The interior rearview mirror system of claim 118, wherein said ~~rain sensor~~-control is operable to adjust a rate of wipe of the window wiper of the vehicle.

120 (currently amended): The interior rearview mirror system of claim 119, wherein said ~~rain sensor~~-control is operable to adjust the rate of wipe in response to a quantity of the water droplets sensed at the exterior surface of the window.

121 (currently amended): The interior rearview mirror system of claim 119, wherein the window wiper comprises a windshield wiper of the vehicle, said ~~rain sensor~~-control being operable to control a rear window wiper of the vehicle.

122 (currently amended): The interior rearview mirror system of claim 121, wherein said ~~rain sensor~~-control is operable to control said rear window wiper in response to said detection of water droplets at the exterior surface of the windshield.

Applicants : Brent J. Bos, Kenneth Schofield, Mark L. Larson and Niall R. Lynam
Serial No. : 10/823,323
Page : 7

123 (currently amended): The interior rearview mirror system of claim 122, wherein said ~~rain~~ sensor-control causes said rear window wiper to cycle for every N cycles of said windshield wiper, wherein N is greater than one.

124 (previously presented): The interior rearview mirror system of claim 123, wherein the value of N varies as a function of the speed of said windshield wiper.

125 (previously presented): The interior rearview mirror system of claim 103 including an illumination device for illuminating at least a portion of the field of view of said imaging sensor.

126 (previously presented): The interior rearview mirror system of claim 125, wherein said illumination device is at least occasionally activated.

127 (currently amended): An interior rearview mirror system of claim 125 suitable for use in a vehicle, said interior rearview mirror system comprising:

an interior rearview mirror assembly adapted for attachment to an interior portion of the vehicle, said interior rearview mirror assembly comprising an electrochromic reflective element;
electronic circuitry operable to control said electrochromic reflective element;
an imaging sensor positioned with a field of view through a window of the vehicle;
an illumination device for illuminating at least a portion of the field of view of said imaging sensor, wherein said imaging sensor is operable to sense a level of ambient light present at the windshield, said illumination device being activated in response to said imaging sensor sensing low light conditions;

a rain sensor control responsive to an output signal of said imaging sensor, said rain sensor control being operable to control at least one of a windshield wiper of the vehicle and a defogging system of the vehicle in response to said output signal;

a headlamp control responsive to an output signal of said imaging sensor, said headlamp control being operable to control a headlamp of the vehicle in response to said output signal; and

Applicants : Brent J. Bos, Kenneth Schofield, Mark L. Larson and Niall R. Lynam
Serial No. : 10/823,323
Page : 8

wherein said rain sensor control and said headlamp control at least one of (a) access a common component of said electronic circuitry, and (b) share a common component of said electronic circuitry.

128 (previously presented): The interior rearview mirror system of claim 127, wherein said headlamp control is operable to control a headlamp of the vehicle in response to said imaging sensor sensing low light conditions.

129 (currently amended): The interior rearview mirror system of claim 103, wherein said imaging ~~array~~ sensor comprises a pixelated imaging array sensor.

130 (previously presented): The interior rearview mirror system of claim 129, wherein said imaging sensor comprises one of a CMOS or a CCD sensor.

131 (previously presented): The interior rearview mirror system of claim 103 including a polarizing filter at said imaging sensor, said polarizing filter being at least occasionally positionable between said imaging sensor and the window, said polarizing filter being operable to attenuate light.

132 (currently amended): The interior rearview mirror system of claim 103, wherein said ~~rain sensor~~ control is operable to apply an edge detection algorithm to said ~~output signal~~ outputs to detect edges of rain droplets on a surface of the window.

133 (currently amended): The interior rearview mirror system of claim 103, wherein said ~~rain sensor~~ control is operable to apply a filtering or smoothing algorithm to said ~~output signal~~ outputs to reduce the effects of scratches on the window of the vehicle.

Applicants : Brent J. Bos, Kenneth Schofield, Mark L. Larson and Niall R. Lynam
Serial No. : 10/823,323
Page : 9

134 (new): An interior rearview mirror system suitable for use in a vehicle, said interior rearview mirror system comprising:

- an interior rearview mirror assembly adapted for attachment to an interior portion of the vehicle, said interior rearview mirror assembly comprising an electrochromic reflective element;
electronic circuitry operable to control said electrochromic reflective element;

- a first imaging array positioned in the interior of the vehicle and with a field of view through the windshield to the exterior of the vehicle, said first imaging array having a first output indicative of sensed images;

- a second imaging array positioned in the interior of the vehicle and with a field of view through the windshield to the exterior of the vehicle, said second imaging array having a second output indicative of sensed images;

- said control being operable to control a windshield wiper of the vehicle responsive to said first output from said first imaging array;

- said control further being operable to control a headlamp of the vehicle responsive to said second output from said second imaging array;

- wherein said control is operable to adjust the rate of wipe of a windshield wiper of the vehicle responsive to images sensed by said first imaging array; and

- wherein said first and second imaging arrays are positioned in the interior cabin of the vehicle at or near said interior rearview mirror assembly.

135 (new): The interior rearview mirror system of claim 134, wherein said control controls a windshield wiper of the vehicle in response to sensing of the presence of water droplets at the exterior surface of the windshield by said first imaging array.

136 (new): The interior rearview mirror system of claim 134, wherein said control controls a defogging system of the vehicle in response to sensing of the presence of fog particles at the interior surface of the windshield by said first imaging array.

Applicants : Brent J. Bos, Kenneth Schofield, Mark L. Larson and Niall R. Lynam
Serial No. : 10/823,323
Page : 10

137 (new): The interior rearview mirror system of claim 134, wherein said electronic circuitry includes at least one of a remote keyless entry receiver, a microphone, a digital voice recorder, a vehicle status indicator and a display element.

138 (new): The interior rearview mirror system of claim 134, wherein said electronic circuitry is associated with a display element.

139 (new): The interior rearview mirror system of claim 138, wherein said display element comprises at least one of a vehicle status display, a blind spot indicator display, a compass display, a temperature display, a tire inflation status display, a passenger side inflatable restraint status display, an automatic rain sensor display, a telephone dial information display, and a highway status information display.

140 (new): The interior rearview mirror system of claim 134, wherein said control is operable to process said first output to detect water droplets at the exterior surface of the windshield and fog particles at the interior surface of the windshield.

141 (new): The interior rearview mirror system of claim 134, wherein said control is operable to adjust the rate of wipe of a windshield wiper of the vehicle in response to a quantity of the water droplets sensed at the exterior surface of the windshield.

142 (new): The interior rearview mirror system of claim 134, wherein said first and second imaging arrays are positioned at said interior rearview mirror assembly.

143 (new): The interior rearview mirror system of claim 142, wherein at least one of said first and second imaging arrays is positioned within said interior rearview mirror assembly.

Applicants : Brent J. Bos, Kenneth Schofield, Mark L. Larson and Niall R. Lynam
Serial No. : 10/823,323
Page : 11

144 (new): The interior rearview mirror system of claim 142, wherein at least one of said first and second imaging arrays is positioned within a module attached to a mirror structure.

145 (new): The interior rearview mirror system of claim 142, wherein both of said first and second imaging arrays are positioned within said interior rearview mirror assembly.

146 (new): The interior rearview mirror system of claim 134, wherein said first imaging array is decoupled from the windshield.

147 (new): An interior rearview mirror system suitable for use in a vehicle, said interior rearview mirror system comprising:

- an interior rearview mirror assembly adapted for attachment to an interior portion of the vehicle, said interior rearview mirror assembly comprising an electrochromic reflective element;
- electronic circuitry operable to control said electrochromic reflective element;

- a first CMOS imaging array positioned in the interior of the vehicle and with a field of view through the windshield to the exterior of the vehicle, said first imaging array having a first output indicative of sensed images;

- a second CMOS imaging array positioned in the interior of the vehicle and with a field of view through the windshield to the exterior of the vehicle, said second imaging array having a second output indicative of sensed images;

- said control being operable to control a windshield wiper of the vehicle responsive to said first output from said first imaging array;

- said control further being operable to control a headlamp of the vehicle responsive to said second output from said second imaging array;

- wherein said control is operable to adjust the rate of wipe of a windshield wiper of the vehicle responsive to images sensed by said first imaging array;

- wherein said control adjusts the rate of wipe of a windshield wiper of the vehicle in responsive to detection of water droplets at the exterior surface of the windshield;

Applicants : Brent J. Bos, Kenneth Schofield, Mark L. Larson and Niall R. Lynam
Serial No. : 10/823,323
Page : 12

wherein said control is operable to process said outputs to detect water droplets at the exterior surface of the window and fog particles at the interior surface of the window;

wherein said control controls a defogging system of the vehicle;

wherein said first and second imaging arrays are positioned in the interior cabin of the vehicle at or near said interior rearview mirror assembly; and

wherein said first imaging array is decoupled from the windshield.